ABSTRACT OF THE DISCLOSURE

A plasma chamber enclosure structure for use in an RF plasma reactor. The plasma chamber enclosure structure being a single-wall dielectric enclosure structure of an inverted cup-shape configuration and having ceiling with an interior surface of substantially flat conical configuration extending to a centrally located gas inlet. The plasma chamber enclosure structure having a sidewall with a lower cylindrical portion generally transverse to a pedestal when positioned over a reactor base, and a transitional portion between the lower cylindrical portion and the ceiling. The transitional portion extends inwardly from the lower cylindrical portion and includes a radius of curvature. The structure being adapted to cover the base to comprise the RF plasma reactor and to define a plasma-processing volume over the pedestal. The structure being formed of a dielectric material of silicon, silicon carbide, quartz, and/or alumina being capable of transmitting inductive power therethrough from an adjacent antenna.